

DEMONSTRATION & DEPLOYMENT SUMMARY

Vac & Ship system removes gravel from B776 suspected buried equipment sites

Summary and Need

The Building 776 Closure Project is one of the most challenging cleanup efforts at the Rocky Flats Environmental Technology Site due to its unique characteristics. Rich in history, the former nuclear building played a major role in manufacturing of plutonium weapons components and waste processing until the 1969 fire. During the cleanup efforts after the Building 776 fire, workers covered 11 pit-like areas with concrete throughout the building for contamination control. The big mystery for more than 30 years has been what was buried in those locations - equipment, barrels, autoclaves? It was thought that equipment too hazardous and difficult to ship for disposal at Idaho might have been buried in the pits.

After characterization and removal of the concrete over-cap for the first pit location was investigated, the project discovered an 18-foot hole of potentially contaminated gravel, where the building's autoclave used to reside. With a need to remove and dispose of an estimated 1.5 million pounds of potentially contaminated gravel, the Building 776 Closure Project teamed with the DOE Office of Science and Technology to find a solution. With consideration for all the project variables, from D&D activities to waste packaging and shipment to direct disposal, the team developed the Vac & Ship system. The system is designed to remove, filter and contain the waste in a specially engineered container that would meet all of the shipping requirements plus the waste acceptance criteria for disposal.

The Technology

The Vac & Ship system makes use of an industrial vacuum similar to those used in the mining industry. The MAXVAC vacuum is designed to remove heavy loads of sand, gravel and dirt thus eliminating workers from manually shoveling the waste out from below-grade locations. The MAXVAC system pulls a negative pressure of approximately nine pounds per square inch. For contamination control and to limit worker exposure, a separate HEPA filter unit was designed to tie into the system and filter radiological particulates. To avoid waste repackaging after removal, the team developed a prototype container that would meet the requirements of the

Department of Transportation and the Nevada Test Site for shipping and disposal. The waste container was sized to optimize for the maximum allowable shipping weight of 40,000 lbs. and minimize the empty void space allowing for the natural angle of gravel (angle of repose).

The unique engineering design criteria for this container is that it will



A HEPA filtration unit and cargo/shipping container were designed to complete the vacuum system.

withstand the high negative pressure association with the vacuum process and be integrated with the filtration equipment. The system allows one-step, closed waste removal to go directly into a shipping container approved for disposal as well. The filtration equipment protects the Vacuum from contamination supporting easy reuse. With minimal parts used to tie-in each piece, the system requires little maintenance, which ultimately results in uninterrupted duty and low operating expenses.

The Demonstration

Facing unknown variables, workers in full-face respirators began using the Vac & Ship system to remove gravel from the 18-foot deep autoclave location in Building 776. The system proved effective during the removal, filtration and container placement of the waste during the project's use. Solving the mystery, no buried equipment was located and no radiological contamination found during the removal of the gravel, so the HEPA filter unit was temporarily taken out of the system so that the waste would go directly into the waste container.



Building 776 employees used the Vac & Ship system to remove gravel from an 18-foot deep pit. The system proved effective and was later used at the Mound Closure Project.

After further characterization of the remaining ten locations, it was determined that concrete was used as filler in the majority of those locations instead of gravel. The system proved to be an effective D&D tool and will be utilized throughout the DOE Complex.

The Results & Benefits

After completion of gravel removal in Building 776, the Vac & Ship system was transferred from the Rocky Flats Closure Project to the Mound Closure Project for use in their technical building. The technical building is a former nuclear building with approximately 10,500 square feet and is a part of the original Mound site. The

building is the only nuclear building at the Mound site that is being transitioned to commercial development. The Vac & Ship system will be an essential part of the decontamination effort in the building.



Technology Supporting the Path to Closure

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